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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,736	10/29/2001	John M. Robertson	F-7561	1087

30188 7590 06/18/2003

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EXAMINER

PITTMAN, ZIDIA T

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 06/18/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

10/074,736

Applicant(s)

ROBERTSON ET AL.

Examiner

Zidia Pittman

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of election of species requirement in Paper No. 4 is acknowledged. The traversal is on the ground(s) that inventions are not independent and are simply claims of varying scope. This is found persuasive. Claims 1-6 and 8-20 will be examined along with newly added claims 21-23.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6 and 8-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bogard et al (USPN 5,205,465) in view of Robertson et al (USPN 5,272,809).

Bogard et al teaches a method for replacing worn airseal lands on engine compressor or turbine disks. The present invention provides a method for the repair of broken, damaged, improperly machined, or worn airseal lands on a compressor or turbine disk, where such lands are made of high strength, high temperature materials such as nickel-base superalloys, or titanium alloys, and also provides a method for the replacement of such lands when appropriate. While the figures are illustrative of a turbine hub, it should be noted that the present invention is equally applicable to compressor disks, turbine disks, etc., wherein the central portion of the rotor is planar. The repair materials should be selected so as to form a strong solid state bond with the material of the disk or hub material. The preferred material would be the same material as the base material of the disk or hub. Figure 5 illustrates the disk assembly of Figure 2, with the worn airseal lands removed, leaving repair site stubs. These stubs should be preferably machined to a relatively uniform smoothness. Figure 6 illustrates a replacement ring to be bonded to the stubs. This replacement ring comprises an oversized load bearing upper section, a lower section, sized to match the stub of the original airseal land which is to be replaced, and a bonding surface. The purpose of the oversized area is to enable one to localize pressure in the narrower region so as to

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achieve a greater degree of upset at bonding surface. The replacement ring is placed in location on the appropriate stub of the inner airseal land or outer airseal land, and forge-joined thereto to yield a bonded disk and airseal land assembly which also illustrates the upset at the interfacial bond line. The newly bonded oversized replacement airseal land may now be heat treated, using a localized heat treatment to assure the airseal land interfacial bond joint having the desired microstructure and properties. After heat treatment, the new airseal land ring is now ready for machining to the final configuration wherein replacement airseal lands have been bonded to disk and machined to the appropriate configuration for use. As previously indicated, the replacement ring is bonded to the stubs by forge-joining. It is to be understood that Figure 7 is meant to represent a typical appropriate press. The term 'press' as used in this specification and appended claims is intended to encompass any device for forcing the components together under very high pressures and temperatures. The components are heated within the press to a temperature sufficient to put at least the replacement ring in a superplastic or highly deformable condition. Sufficient pressure is then applied to the components to cause the replacement ring to deform at its bonding surface to create line-on-line contact over the entire bonding surface of the replacement ring and the stub to which it is being applied. The high pressure and temperature are held until a solid state diffusion bond is achieved. (column 3 line 10 – column 4 line 47)

Bogard et al does not disclose a direct heating of the contact areas.

Robertson et al teaches a technique for direct bonding cast and wrought materials. The present invention provides a method for joining a wrought superalloy to

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a cast superalloy material. The invention is exemplified by the repair of broken, damaged, or improperly machined parts of components for gas turbine engines, where such parts are made of high strength, high temperature materials such as nickel-base or cobalt-base superalloys, or titanium alloys, and also provides a method for the replacement of such parts when appropriate. Surprisingly, we have discovered that a wrought replacement part, such as a lug, may be joined to the cast vane assembly, by a forge joining technique. By use of a wrought replacement piece in a re-designed configuration, superior high temperature lug strength properties may be attained in the component, resulting in a vane assembly having adequate creep capability to meet design requirements, and superior high temperature strength in the lug per se. In accordance with an exemplary use of this invention, a cast vane assembly comprises a vane outside diameter platform, vanes, and an annulus inside diameter platform. The outer diameter platform has projecting lugs, adapted to fit or engage circumferential flanges or retaining rings on the engine case. Frequently, as a result of damage during installation or in use, lugs on such vane assembly are broken off, which illustrates a vane assembly having stubs, where retaining lugs were formerly located. These stubs, or damaged areas of the vane assembly, may be machined away, to leave a vane assembly having a uniform repair site, in the location of the failed or broken lug. An oversized retaining lug blank, having the requisite dimensions to replace the failed lug, is then positioned over the uniform repair site, in contact therewith. This replacement lug blank is preferably of the same general composition as the cast vane assembly composition, but of a wrought alloy corresponding thereto. The replacement blank is

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accurately clamped in position in relation to the repair site, and is forge joined thereto by heating the interface surfaces of the blank and the repair site to a temperature within the solution temperature range of both alloys, but not exceeding the solution heat treatment temperature of either alloy, and without causing local melting or significant grain growth in the vane assembly and the replacement lug blank. As previously indicated, the present invention is specifically exemplified by the repair of damaged gas turbine engine vane assemblies, which assemblies are normally made of a cast high temperature material, such as either non-hardenable or precipitation-hardenable nickel-base superalloys, or titanium. Preparation for a part repair includes machining away the broken area of the failed part. The replacement blank is sized to provide the desired part size and configuration after machining, and is configured so as to provide a bonding surface having a close tolerance fit to the bonding surface of the assembly. After the replacement blank is positioned in close proximity to the bonding surface of the assembly, as in a tooling fixture or jig, a forge joining pressure is applied to the blank. While this pressure is applied, the interface between the blank and the assembly bonding surface is locally heated. (column 4 line 15 – column 6 line 48)

With respect to the limitation requiring the part to not be fusion weldable, the examiner contends that although the cited reference doesn't explicitly state this limitation, it would be obvious that the materials utilized in the reference would have this same feature, since the materials of the claimed invention (nickel-based superalloy or titanium alloy) corresponding to one of the cited materials of the reference.

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At the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the teachings of Bogard et al with the teachings of Robertson et al in order to minimize distortion, optimize properties, and stress relieve the bonded assembly.

Response to Arguments

Applicant's arguments with respect to claims 1-6 and 8-14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

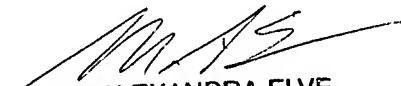
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zidia Pittman whose telephone number is (703) 305-1248. The examiner can normally be reached on Monday – Thursday and alternate Fridays from 8:30 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn, can be reached at (703) 308-3318. The official fax phone number for the organization where this application or proceeding is assigned is (703) 305-7718. The unofficial fax number for art unit 1725 is (703) 305-6078.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-

0661.

37P
6/12/03


M. ALEXANDRA ELVE
PRIMARY EXAMINER